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Preface of Bioremediation through Rhizosphere Technology

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Abstract
The use of MICROORGANISMS to remediate environments contaminated by hazardous substances is an innovative technology and an area of intense interest. Although biological technology has been used for decades in wastewater treatment, recent examination of the cost-effectiveness of this technology has led to its application to hazardous chemicals at waste sites. Successes obtained by using the natural metabolic capabilities of bacteria and fungi to clean up soil, sediment, and water have encouraged continued interest and research in bioremediation.

Disciplines
Entomology | Environmental Microbiology and Microbial Ecology | Organismal Biological Physiology | Plant Sciences

Comments
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Preface

THE USE OF MICROORGANISMS to remediate environments contaminated by hazardous substances is an innovative technology and an area of intense interest. Although biological technology has been used for decades in wastewater treatment, recent examination of the cost-effectiveness of this technology has led to its application to hazardous chemicals at waste sites. Successes obtained by using the natural metabolic capabilities of bacteria and fungi to clean up soil, sediment, and water have encouraged continued interest and research in bioremediation.

Microbial degradation of toxicants can be hindered, when, for example, the population or activity of microorganisms capable of degrading the toxicants is limited by the environmental conditions. In such cases, environmental conditions must be altered to effectuate remediation. The use of vegetation to facilitate microbial degradation of toxicants may be a viable method for remediating contaminated environments in situ. The plant root zone, or rhizosphere, provides a habitat conducive to the proliferation of microbial growth and activity. Previous research indicated decreased persistence of pesticides in rhizosphere soils. Recent investigations revealed similar results with industrial chemicals such as surfactants, oil residues, polycyclic aromatic hydrocarbons (PAHs), pentachlorophenol, and trichloroethylene.

Although numerous texts deal with the rhizosphere, this is the first book on the potential use of the rhizosphere for bioremediation. The book is divided into four sections. Overviews of bioremediation and rhizosphere microbiology are provided in the first section. The interactions between microorganisms, plants, and chemicals in the rhizosphere are presented in six chapters contained in the second section. The degradation of industrial chemicals in the rhizosphere, including PAHs and chlorinated phenols, is presented in the third section. Finally, the section on microbial degradation of pesticides in the rhizosphere contains chapters on herbicides as well as applications to pesticide-contaminated sites. Overall, we believe the book provides the lay reader with valuable review information that puts in context the potential role of the rhizosphere in bioremediation. In addition, the book provides those active in this area of research with a document that summarizes the current state of the science.

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